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MATSUCOCCUS RESINOSAE B. & G. ON RED PINE IN CONNECTICUT

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by

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Red pine, Pinus resinosa, and white pine, Pinus strobus, are the principal tree species that have been used in reforesting the tens of thousands of acres of farm land abandoned after the turn of the century in the northeastern United States.

One of the more recent pests discovered on red pine is a Matsucoccus scale, which was described as a new species, Matsucoccus resinosae B. & G., in 1955.[1/] Thousand of acres of valuable watershed plantings and potential timber crops of red pine are in danger as long as this insect remains active. Trees die about 3 to 5 years after they have become generally infested by the scale.

1/ Bean, J. L., and P. A. Godwin. A description and bionomics of a new red pine scale, Matsucoccus resinosae. Forest Sci. 1: 164-176. 1955.

Since Matsucoccus was first discovered in Connecticut in 1946, and subsequently on Long Island, New York, there has been very little change in the distribution of the insect. When the last complete survey was made in 1953, the scale was restricted to approximately 40 square miles on Long Island, scattered spot infestations in Westchester County, New York and another 60 miles in Connecticut.

In 1955, this area was partially re-examined. The results of the survey show only a continued similarity in the distribution pattern that we have found in recent years. That is, the pest appears to infest new territory at the rate of about 1 mile each year. To be sure, there has been considerable tree mortality, and the insect currently infests valuable watershed plantings, which may eventually succumb; however, spread in terms of great distances or infestation throughout thousands of acres of red pine has not occured. In both states the actual area infested probably does not exceed 2,000 acres.

Several factors have aided in preventing more widespread dispersion. First, the insect is not well adapted to moving considerable distances under its own power. The wingless females and the tiny mobile crawlers are poor travelers and cannot survive unless they reach suitable host plants within a brief time. Second, red pine is rather sparsely scattered throughout much of the infested area--sparsely in terms of numbers of areas and also in the size of these individual areas. Small isolated groups of infested trees found in many localities may be ineffective focal points for spread of the pest to new centers.

The possibility exists that the insect might be accidentally spread through the movement of ornamental planting stock. The largest home-building program of all time has flourished throughout the Matsucoccus zone, and the use of ornamental plants accompanying this boom is phenomenal. Several years ago, this situation was checked in both states involved; however, a periodical review of the problem will be required. Extreme caution will have to be exercised to avert undesirable spread of the scale. Because of this potential threat, surveys will be continued.

Up to 1955, Matsucoccus was thought to be host specific. Laboratory and field experiments conducted prior to this time in an effort to establish the scale on other species of pines were unsuccessful. Twenty-five species of native and introduced pines were used in these tests. Two of the species that were artificially infested in 1954, and again in 1955, now support a normal population of Matsucoccus on some branches. These species are Japanese red pine (Pinus densiflora) and Chinese pine (Pinus tabulaeformis). Initially, these host studies were started in the hope that they might shed further light on the origin of the scale. As yet, the question of whether the pest is native or introduced has not been resolved.

Japanese red pine, one of the two new species infested, is a very popular ornamental plant in wide use at the present time. In the areas in question this pine has replaced red pine as one of the favorite ornamental plants, because of the severe damage done to red pine by the European pine shoot moth, Rhyacionia buoliana.

Little can be said about the new host-insect relationship until additional field testing is completed, for we are not certain yet that the insect will infest these trees under natural conditions. This aspect of the problem will be investigated because certainly the potential is tremendous if we consider the movement of ornamental stock as a primary factor in dispersion of the pest.

Now for a few minutes, I would like to turn to the control of Matsucoccus. First let us consider the insecticidal testing, which has been going on since 1951. To date about 30 various compounds have been screened and applied in laboratory or field trials. These insecticides encompass almost the entire field of pest control as we know it, since the chemicals include the standard hydrocarbon and phosphorus compounds, fumigants, systemic poisons, miticides, and oil contact insecticides.

It did not take long to realize after preliminary screening had begun that control of this pest would be a difficult task. Perhaps a simple illustration in terms of insect abundance will describe the problem. The following figures are actually taken from 1955 field trials and represent the best results attained thus far. Prior to any control, pre-spray sampling disclosed 100 insects per square inch of bark. After two applications of Chlorthion about 1 week apart we are able to reduce the population by 99 percent--or to one insect on the initial sample unit. One month after treatment and the start of a new gereration the single insect has multiplied to ten, and by the end of the summer, following a second gereration, we are back to the original 100 specimens per square inch of bark.

The logical question to follow might be: "Why not another application at the right time to kill that 1 percent?" Frankly, it does not seem possible to do much more than this under plantation conditions unless we wish to consider red pine more as an apple tree than as a reforestation tool or forest crop. When you realize that the most effective chemical, Chlorthion, is currently being applied by mist blower in high concentrations at the rate of 100 to 200 gallons per acre in order to attain 99 percent control, and that 99 percent control is only a temporary thing, then I think you begin to visualize the magnitude of further refinements that are required.

As a result of this past season's work, we feel that chemical treatments made in the fall may be more effective than spray applications made in the spring. Although the overall reduction in population is identical at either time of the year, there is a good reason to believe that natural winter mortality may help substantially in reducing the number of survivors. This was strikingly demonstrated two seasons ago when a prolonged cold spell with temperatures in the minus 15° to 20° F. range killed a large proportion of the overwintering scales.

Since that initial experience ably demonstrated that cold might be a limiting factor in either the buildup of the pest or its dispersion into a colder climate, additional testing has continued. This work has been confined primarily to cold-chamber studies. To summarize these cold-hardiness investigations briefly, we can say that adverse temperatures may be an important control periodically. However, even at a temperature as low as minus 29° F., there have always been survivors. Therefore, it is readily discernable that severe winter temperatures may prevent a buildup of populations to damaging proportions in many areas of the northeastern United States; but it in no way indicates that the insect will not survive in these areas.

Other forms of natural control exist, but have not proved to be effective thus far in limiting Matsucoccus populations. The pest seems almost impossible to eliminate even with the tremendous dosages of insecticides that we have been using. So it seems time to consider how best to live with the insect and keep it under control. With this approach we need to learn, among other things, as much as possible about the natural factors that may help us keep the insect at a low level.

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